

What is claimed is:

1. An optical element comprising:
a liquid crystal layer made by forming and curing a film of a liquid crystalline material; and
a protective layer formed on the liquid crystal layer, said protective layer having hardness high enough to prevent the liquid crystal layer from being deformed by externally exerted forces.
2. The optical element according to claim 1, wherein the protective layer has a modulus of elasticity (= (elastic deformation) / (total deformation)) of 0.6 or more as determined by pushing an indenter into the protective layer with a test force of 2 mN in accordance with the universal hardness test method.
3. The optical element according to claim 1, wherein the protective layer is made from a material that comprises a resin and a monomer.
4. The optical element according to claim 1, wherein the liquid crystalline material from which the liquid crystal layer is made has cholesteric regularity.
5. The optical element according to claim 1, wherein the liquid crystalline material from which the liquid crystal layer is made has nematic regularity.
6. The optical element according to claim 1, further comprising an alignment substrate that supports the liquid crystal layer, said alignment layer being disposed on the liquid crystal layer opposite to a surface of the protective layer.
7. The optical element according to claim 6, wherein at least a part of the outer peripheral region of the liquid crystal layer is removed, and the protective layer is formed to cover an upper surface as well as at least a part of a side surface of the liquid crystal layer formed on the alignment substrate.
8. The optical element according to claim 6, wherein the liquid crystal layer formed on the alignment substrate

includes a plurality of regions corresponding to display regions of respective colors of red, green and blue, the regions being formed with spaces therebetween, and the protective layer is formed to cover an upper surface of the liquid crystal layer and to fill the spaces between the respective regions of the liquid crystal layer.

9. The optical element according to claim 1, wherein the optical element further comprises an alignment film and an electrode disposed on the surface of the protective layer opposite to the surface of the liquid crystal layer, the alignment film and the electrode aligning and driving liquid crystals in a liquid crystal cell, respectively.

10. The optical element according to claim 1, wherein the optical element further comprises a color filter layer of a light absorption type disposed between the liquid crystal layer and the protective layer.

11. The optical element according to claim 1, wherein the optical element further comprises a color filter layer of a light absorption type disposed on the surface of the protective layer opposite to the surface of the liquid crystal layer.

12. The optical element according to claim 1, wherein the liquid crystal layer functions as at least an element selected from the group consisting of a polarized-light-separating element, a color filter and a retardation film.